An Experimental Study of Character Traits

A Thesis submitted by
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AN EXPERIMENTAL STUDY OF CHARACTER TRAITS

By Raymond O. Filter, University of Minnesota

I

Study of Self-Assurance

Analysis of the Trait

The looseness of meanings attached to names of character traits demands first consideration. A trait must be defined in order to be studied intelligently. Because definition cannot be made with any degree of accuracy is no good reason for neglect of it. A little attempt to see as a whole and in its various aspects the trait which one studies is sure to be more effective than the procedure of devising tests and naming them as measures of anything at all.

Let the following table I illustrate an attempt at definition. It is a list of typical situations which commonly evoke the reactions that are given this trait-name, together with the reactions comprising the trait. That is, reactions which would represent a high degree of the trait are listed (in the second column) and negative responses, representing a low degree of the trait, are also shown (in the third column). The underlined qualification which appears prominently in the table, OTHER FACTORS BEING EQUAL, demands constant emphasis. Not only self-assurance but a host of other traits and conditions might be responsible for the reactions listed. These other factors must clearly be discounted or equalized before the reactions may be viewed as symptoms or measures of self-assurance. In experiment they must be recognized and evaluated or controlled.

In spite of its incompleteness and its errors (one error will be pointed out later on the basis of experimental findings), the table at once shows its usefulness. One devises tests

TABLE I

SHOWING TYPICAL SITUATIONS AND REACTIONS INVOLVING SELF-ASSURANCE

Situations	Reactions Other Factors Being Equal	Negative Responses
1. A new situation demanding response.	Undertaking with readiness, carried out beyond demands.	Excessive inquiry—and waiting for directions.
2. A new situation inviting response.	Ready acceptance.	Declined; or needing stronger invitation.
3. Many tasks inviting response.	Acceptance of many.	Carrying a light load.
4. A task demanding preparation.	Tendency to undertake without thoro preparation.	Careful preparation.
5. A task recognized as imposing, difficult.	No hesitation, total engagement, not half-hearted attempts.	Hesitation—partial performance.
6. Responsibility offered.	Accepted.	Avoided
7. Responsibility not offered.	Sought—opportunity made.	Not desired—probably not thought of.
8. Opinion asked.	Readily given.	Modestly withheld or qualified.
9. Estimate of one's own qualities called for.	Given with little delay.	Long pondering.
10. Selection, preferences called for.	Speed of decision.	Slow, wavering decisions.
11. Estimate of one's own capacity to perform certain tasks called for.	Selection of material near limit of capacity, or over-estimation.	Under-estimation.
12. Contradicted when asserting one's own memory of an event, act, etc.	Denial of error.	Acceding.
13. Contradicted in personal convictions by authority and by associates.	Maintenance of conviction (not necessarily public expression).	Suggestible (Re matters of opinion.)

which shall approximate some one or a few of these type situations, and then the table does its further service of preventing generalizations. Successful measurement of some one aspect or element of the trait must clearly be regarded as no measure of the trait. Until its relation to the trait in all of its aspects is determined, no single measure can be safely labelled as a test of self-assurance and be used as such.

Experimental Procedure

In addition to the recognition of the complexity of a character trait there is necessary some insight into its nature as an attribute of individuals. Is it a relatively constant or a variable attribute?

Let us restrict the inquiry at first to just one aspect of the trait, namely to item No. 11 in table I, to expressions of tendencies towards over-estimation. The problem is, to what extent do persons who over-estimate (or under-estimate) their capacities in one situation—on one kind of material—tend to do so in other situations—on other materials?

The different tests which were devised, and applied, vary in value as controlled measures of over-estimation. Only two of them are worthy of complete description. These two tests, however, do seem to possess advantages which should be noted. In the first place, they serve the present purpose very well, of presenting two situations for comparison, which are identical in every respect excepting in the matter of material on which the estimate is based. Test No. 1 calls for estimates of one's capacity to manipulate; test No. 2 calls for estimates of one's capacity to reorganize and reproduce visual impressions; both activities are equally unfamiliar or equally unpracticed (at least in the case of all the subjects to these experiments); and manner of presentation of the material, and all other conditions are identical. In the second place, both tests are objectively scorable.

Test No. 1. STRING FIGURES. (Photographs from Caroline Furness Jayne's book, "String Figures," C. Scribner's Sons, 1906.)

Preliminary: Task was to reproduce with loop of string on fingers patterns shown clear and traceable on pictures. Three patterns, a very simple one and two of representative complexity, were tried, and Subject informed regarding the amount of time he needed for each.

Test Question: Showing S ten more, one at a time, ask: "Which ones of these do you feel sure you would be able to do if allowed 4 minutes for each?"

Criterion of Self-assurance: Number chosen plus number over-estimated (as shown by actual performance tested later).

Measure of Speed of Decision also obtained: Total time from moment No. 1 is handed to S until No. 10 has been chosen or discarded. S not aware of the fact that time is being taken.

Test No. 2. DECOUPAGE. (Binet's test extended.)

Preliminary: Task was to "Draw what the folded and torn paper looks like opened up." Three different patterns tried, the original Binet and two other simple ones. Subject allowed to compare his drawings with the actual pattern.

Test Question: Ten more are folded and torn, and S asked after each one—"Could you do this one correctly, if you were to see it folded once more later, just before drawing it?"

Criterion: Number chosen plus number over-estimated. Speed of Decision measured:—total time of choice—the folding procedure being practically constant for each S.

Dr. June Downey's Will Profile (U. of Wyoming Bulletin No. 3, 1919) contains a test of Assurance, which was utilized in this study. Two sealed envelopes, one stamped M and the other N, are held before the subject for selection. They are then put aside for a while, and when later brought under reconsideration, E makes a point of contradicting the assertions of S relative to which of the two envelopes he had previously chosen. Degree of resistance to contradiction is scored by comparison with standard sample responses. The scoring of this test is not strictly objective as in tests No. 1 and No. 2.

Two tests of Speed of Decision were also given. According to the definition of the trait, table I, items 8, 9 and 10, speed of decision was presumed to be to some extent indicative of self-assurance. Therefore measures of speed of decision were secured in connection with tests No. 1 and No. 2, and two more tests of speed of decision were borrowed. Again Dr. Downey's Will Profile provided a measure, in the Character Checking Test. A list of character traits in pairs is presented and S instructed to check the one trait in each pair which he thinks he possesses. Amount of time employed determines the score.

A modification of Münsterberg's Decision test, the form devised by Sybil Marsh Gibson (A Decision Study of 150 Young Men and Women. *J. of Applied Psych.*, Dec. 1920), constituted the other test of speed of decision. Cards bearing the letters E, I, Y and K, in scattered arrangement, are given S to be examined. S is to decide, without counting, which one of the four letters appears most often on the different cards.

Time and accuracy can be scored, but only time was scored for the purposes of this study.

These tests were given to a group of 26 University students, members of several classes in psychology, and yielded the following results. Disregarding for the present the bearings of speed of decision, and confining attention to the three tests of assurance, the correlations by Rank Difference Method were:

Between Test No. 1 String Figures and Test No. 2 Decoupage } r = .09

Between Test No. 1 String Figures and Test No. 3 Assurance (Downey) } r = —.10

Between Test No. 2 Decoupage and Test No. 3 Assurance (Downey) } r = —.10

Here is a fair demonstration of variability. If it were established on the basis of a greater number of cases we should conclude that possibly our trait of Self-assurance is purely a function of external factors—of the particular situation—and no constant attribute of individuals at all. What is unequivocally demonstrated is the fact that no one of these tests can be rightfully used alone as a measure of assurance.

Tests No. 1 and No. 2 are of a nature which permits of repetition on the same individuals, after an interval of several months probably, and their reliability may be determined. This has not yet been done.

An attempt has been made to determine the validity of the tests as measures of self-assurance through correlation with estimates. A rating scale was prepared which described six types of individuals, varying in degree of self-confidence, with a grade assigned to each; and then groups of subjects were found who were well acquainted and who provided estimates of each other. The rating scale was successful in serving as a real aid to the judges and in securing very close agreement (M. V. slightly more than a half step) in the different estimates of the same person. But no test results were found to correlate very high with the estimates.

TABLE II

Correlations with estimates. Two different groups: 6 boys, members of one fraternity. 14 girls, members of one sorority.

	6 cases	14 cases
Measures of Over-estimation		
Test No. 1 String Figures r =	.70	.32
Test No. 2 Decoupage	.70	.28
Measures of Speed of Decision		
Time in Test No. 1	.07	—.14
Time in Test No. 2	.19	—.42
M. Decision Test	—.10	.54
Character Checking	.17	

It became apparent that a mistake was made in attempting to correlate specific test results with estimates on self-assurance considered generally. In order that estimates may serve as a criterion of a test they should be based upon knowledge of activities related to those involved in the test, and upon such activities alone. The scale should be replaced by a number of scales, each descriptive of some different specific kind of self-assurance. In the same manner as the subjects were graded by friends for self-assurance in general (on the scale used), they might be graded for self-assurance in limited spheres of definitely specified types of situations—in matters of athletics alone, or matters of scholarship alone, or in handiwork, or brain work, or in home circles, or in public view, etc., etc.

The following table III summarizes all of the correlations between measures of speed of decision. The correlations are based on as many cases as could be compared, regardless of groups.

TABLE III

No. of cases		
20	Time in String Figures and Decoupage..... r	.38
20	Time in String Figures and M. Decision....	.29
20	Time in Decoupage and M. Decision.....	.28
	(Subject No. 42 was first in speed in all three of these tests.)	
22	Time in String Figures and Char. Checking.	.30
33	Time in Char. Checking and M. Decision...	.15
45	Time in M. Decision and Accuracy in same.	—.50
14	Average rank in Speed of Decision and Estimates	—.02

Conclusions

Evidence showing that the two original tests, No. 1 and No. 2, actually serve as measures of Self-assurance is not at hand. That they possess certain advantages, however, was noticeable to all who studied the tests and observed the reactions to them. The most promising features may be enumerated as follows:

1. Scorable on a strictly objective, quantitative basis.
2. Reactions represent actual attitude of S, not a mere guess without insight.

The trials given are directly comparable with the material estimated.

3. Other factors fairly well controlled.

The objectivity of the material precludes likelihood of much change in reaction under varying subjective conditions.

Test activity uninfluenced by experimenter.

Recognition of purpose of the test makes little difference. Desire to show much confidence in estimating is counterbalanced by desire to show ability to perform the patterns chosen.

Note the correlation of —.02 between average rank in speed of decision and estimates on self-assurance. Though the criterion is faulty, as already indicated, it nevertheless serves for comparison and probably has some value for showing general relationship. Whereas the measures of over-estimation showed low but positive correlations (table II) with the estimates, none of the measures of speed of decision show consistent agreement; and their combined effect (table III) is seen to be entirely unrelated.

A distinction which was not made in Table I, where the trait was defined, is brought to mind by this observation, namely a distinction between decisiveness, or strength of decision, and confidence in one's own powers, or self-assurance in its true meaning. It is a distinction between the manner in which the decision is given, and the kind of decision given. Speed of decision, as a mode of decision, is probably an expression of decisiveness rather than of self-assurance. At least, it does not appear to be the latter. Items 9 and 10 in the table I, defining self-assurance, should evidently be discarded. Whether other measures of decisiveness (such as can be secured by answers to the question, how sure are you? by double checking answers, etc.), whether these show a close relationship to measures of speed of decision, has not been determined. Their relation to measures of self-assurance should also be ascertained.

Quite clearly, too, Speed of Decision seems not to be measured adequately by the Downey Character Checking test, nor by any other single test. Surely when we speak of speed of decision we are as likely to be understood to mean that an individual will decide quickly how much or how difficult labor he can undertake (the consideration under tests No. 1 and No. 2) as to mean that he will quickly decide which trait he possesses (the consideration in the Character checking test). And the results show (table III) that to measure speed in one gives little or no indication of speed in the other type of decision. Such facts should be kept in mind when speed of decision is the subject of conversation.

Possibly if a larger group of persons is brought under examination in a greater number of tests a degree of constancy or generality of the trait may be discovered, but we have no evidence of that possibility beyond the one presented here

in the case of our subject No. 42, who led in speed of decision in three tests, choosing more rapidly than all her comrades in String Figures, Decoupage, and M. Decision test. It is exceedingly regrettable that the Character Checking test had to be eliminated from her group because of mere lack of time. (S No. 42 was ranked 8th, with grade C, for Self-assurance by her friends.)

Speed and Accuracy in the M. Decision test show a distinct negative correlation (r —.50).

The extension of these tests to a greater number of subjects, and also comparison with a greater number of similar tests composed of varied kinds of material, is essential to the definite determination of whether the tendency towards over-estimation is or is not a highly variable and unpredictable trait, and whether or not any one test may be expected ever to serve as a measure.

With reference to the general program of learning something about Self-assurance, it is demonstrated emphatically that we have succeeded no farther than to outline the problem and discover the difficulties that beset its solution. The way for progress is indicated to some extent in our recognition of the need, just expressed above, of completing first the observations relative to the one assumed element of the trait, Over-estimation. We need to know whether or not the tendency to over-estimation can be measured before measures of the total trait can be looked forward to.

The road by which we must climb to insight into character should not be regarded as a highway to be covered with a bound. Quick, quantitative results may establish useful enough measuring devises, but may leave us at the end totally ignorant of what we measured.

Summary

1. Over-estimation, based upon good insight, is a promising criterion of Self-assurance.

2. Tests No. 1 and No. 2 possess advantages for the observation of tendencies to over-estimate. (But the tests are lengthy taking about 20 to 30 minutes each, with the necessary three trials, selection, and then performance.)

3. Tests No. 1 and No. 2 serve excellently for measure of Speed of Decision, on a significant type of decision—"How much can you do?" (Performance not necessary in this case, hence tests can be given in about 10 minutes each.)

4. Speed of Decision is probably not indicative of Self-assurance.

5. Little constancy in speed of decision on different materials is manifested.

6. There is a marked negative relation between Speed and Accuracy in the Münsterberg Decision test.

7. The classification of specific self-assurances and development of separate criteria (rating scales, et al) for each, is a suggested future program which may make possible the determination of validity of tests.

II

Study of Speed of Decision

An early study by J. W. Bridges (An Experimental Study of Decision Types and their Mental Correlates, Psych. Mon. XVII, No. 1, 1914), concludes with the following assertions regarding speed of decision:

1. Some subjects are very quick and constant in simple situations but are relatively slower and more inconstant when decisions are more difficult.

2. Those quick in subjective decisions are not always quick in objective decisions. (Objective are decisions on matters quite apparent to sense, like judging which card had more holes in it—they would be easily and certainly scored; subjective are decisions on matters of taste and opinion—difficult to score.)

3. In general, practice has no marked effect upon decision time.

In the face of this evidence the use of the two objective measuring devices of character which exist [1] definitely implies a faith in the constancy of character traits, and of speed of decision among them. For when using the scales one gives a grade on speed of decision though only one, or at the most, two kinds of decision have been measured.

Thus the common-sense notion of the trait seems to be carried into scientific usage, where it demands further searching inquiry. In the case of these scales, it may be that the choice of materials has been an exceedingly happy one, and that speed of decisions (in the plural) is fairly well represented in the results (as is evidently assumed); but this seems by no means to have been demonstrated.

Is speed of decision a trait—a general trait, of which we may speak in the singular? Is it a constant and predictable

[1] Reported at the Chicago Meeting of the American Psychological Association, 1920.
(1) A Group Will-temperament Scale, reported by Dr. June Downey.
(2) Test No. IX, Form 1800, of the Bureau of Personnel Research of the Carnegie Institute of Technology, reported by M. J. Ream.

characteristic of an individual's reactions, regardless of the nature of the decisions called for? Are there individuals who show themselves to be quick in decisions of all kinds? Or of many kinds? Or of customary kinds? Are there other individuals who excel in one or a few kinds of decision, while they prove ordinary or very slow in other kinds?

Such, and related, questions must be answered before the hope of securing any single representative measure of speed of decision can be entertained.

It was seen that Bridges has given a negative reply to the main questions suggested above. His answer, however, may be regarded as not decisive, inasmuch as it was arrived at by observation of only 19 subjects. It gives only a suggestion of the probable nature of the trait in the general population.

However, the investigation on Self-assurance just reported in the foregoing section, disclosed again a condition of lack of constancy in the speed of decision of a group of 20 persons, and more in some cases. None of the time correlations is high, .38 being the highest found between any two tests. But with this observation and its support of the view in favor of a general lack of constancy in speed of decision, the very noticeable fact appears that one subject in the group of twenty took first rank in speed in as many as three different tests. Such a fact discourages the hasty generalization regarding the inconstant and unpredictable nature of the trait. Possibly larger groups than those tested so far contain more of such individuals who distinguish themselves by the possession of general superiority, or inferiority, in speed of decision. The present investigation is now an attempt to determine the strength of this possibility by varying and extending the observations.

The aim is to measure the reactions of a large group of individuals to a variety of decision-problems, and to observe whether constancy or variation in speed is the rule; to observe also if possibly the general rule for the mass hides any significant groups of exceptions.

Description of the Tests

A brief statement of the instructions for each test, and where possible an illustration of the material, is given here. In practice the instructions were read aloud to the subjects, and the tests were bound together in the form of a pamphlet. No test was seen before signal to start was given. After one test was completed all subjects listened while instructions for the next one were read. So through all six.

Test I. Check the one trait in each pair which you possess:

Patient	Impatient
Cautious	Reckless
Dull	Clever
etc.	

Test II. Write in small square below each group the most frequent letter:

This test has been described in the foregoing section, as the Munsterberg Decision Test modified by Sybil Marsh Gibson.

Test III. Grade these actions as follows:

If VERY VERY GOOD.....VVG
If VERY GOOD.....VG
If GOOD.....G
If INDIFFERENT.....I
If BAD.....B
If VERY BAD.....VB
If VERY VERY BAD.....VVB

To be an active church member.....

To praise your own cooking.....

To tip your barber regularly.....
etc.

Test IV. Check the one item in each pair which in your opinion has the greater value *to the human race*:

tea kettle.....flatiron.....

science.....music.....

mirrors.....keys.....
etc.

Test V. Compare each of the figures below with the small square above the line. Write an S, L, or E inside of each figure—

S if smaller than the square in area
L if larger than the square in area
E if equal to the square in area

Test VI. Which is the greater evil, generally? Check one of each pair. Do not skip, but take one pair at a time in order:

To use cosmetics (paint).....	To chew gum noticeably in public.....
To frequent burlesque.....	To frequent bull fights.....
To hunt out of season.....	To be instrumental in reinstating capital punishment.....
	etc.

Test I is the Downey test for speed of decision, with a few additional traits added to the list. Test II is the M. Decision test, modified and transformed from a card sorting test to a paper test, but retaining its essential characteristics. Tests III, IV, V, and VI are original contributions, though clearly patterned after many of the questions and problems that have been devised to test moral disposition and appreciation. One feels a distinct freedom from the hazardous interpretations of the student of moral disposition in employing material of this kind in a manner which disregards the nature of the responses given. For here the concern is only speed, and no interest is attached to the values of the replies. Of course, the subjects taking the tests are instructed in a manner to produce careful consideration on their part. Even purely hypothetical norms of performance are referred to as actual in the instructions in an attempt to make the subjects feel the need of careful judgment, and to make accuracy of performance appear the significant consideration in the score.

The different tests call for a variety of decisions. They are planned to bring into play a number of different kinds of factors—to stimulate a variety of the typical considerations —that tend to make people hesitate when deciding. Test I is distinctive in its demand upon self-reference, and it invites all the difficulties of introspection and the hesitations due to modesty in assertion. Test II presents objective, easily verifiable material, but it deprives the subject of the method by which he would ordinarily determine his answer. (He is not permitted to count the letters.) The question differentiating persons in this test seems to be: "Can I trust the hasty impression?" Test V involves decisions of the same objective kind, and the same causes for hesitation.

Tests III, IV, and VI are of a kind in presenting subjective material for judgment—that is, the decisions are to be based on matters of opinion, on social and moral considerations of a high degree of complexity, on personal convictions. Test III differs from test VI only in its demand that grades be assigned as answers, in place of the mere check on a paired comparison. It calls for absolute judgments in contrast to the relative judgments of test VI. Test IV has an advantage among these tests of so-called subjective decisions in reducing the element of speed of reading which possibly affects the scores on these tests.

Results

A time limitation was set on the tests, and amount of work —number of decisions—scored.

The number of records obtained was 142. They represent the reactions of a very homogeneous group of university students, mostly under the Junior year in school, though including a few advanced students. The records of the latter, however, show no noticeable deviation from the rest.

The time limitations for the various tests were determined by preliminary trial upon a group of 25 students, and set below the fastest performances in that group, the aim being to have no persons finish the test. Unfortunately this trial group, an evening class in Applied Psychology, did not contain the most speedy performers, and as a result the tests were launched out upon the regular class groups with a time limitation too lenient. Quite a number of individuals finished some of the tests. This circumstance causes a distortion of the distributions of scores which must be referred to later when results are interpreted.

INTERCORRELATIONS OF TEST RESULTS. 142 CASES. PEARSON PRODUCT MOMENTS FORMULA

	Test I	Test II	Test III	Test IV	Test V	Test VI
Test I	...	.43	.47	.56	.31	.51
Test II	.43	...	.51	.50	.66	.32
Test III	.47	.51		.55	.45	.40
Test IV	.56	.50	.55		.57	.46
Test V	.31	.66	.45	.57		.37
Test VI	.51	.32	.40	.46	.37	

These coefficients of correlation are not as useful as are other summarizations of the results which follow. In the first place the distortion of distributions—the above-mentioned massing of scores at the top of each scale, due to the fact that the time allowed for the tests was too great—has an influence upon these correlations which is difficult to estimate. It must lower it somewhat, though probably not a great deal. In the second place, this influence is not equally strong upon each of the correlations in the table, and comparisons must be accordingly uncertain.

If the coefficients are accepted at their face value, or with some allowance for the attenuating circumstance, they would seem to indicate a degree of constancy in speed of decision. Those persons who are quick in decisions of one kind tend to be quick also in decisions of quite another kind. The correlations are not high enough, however, to warrant the con-

clusion that any one test would serve as a measure of speed of decision. This is the important conclusion which may be safely drawn from these figures. It seems almost absurdly simple as the objective of elaborate investigation, but after all, the demonstration serves a good purpose. It is essential to the success of character testing that pictures of this kind be presented, for without them exalted opinions regarding the worth of single tests are apt to prevail. Later figures will show how unfortunate would be a classification of persons according to score on one or two tests of this trait.

The two tests which show the highest correlation with one another are numbers II and V, the two which have been described as objective and as being in that respect similar to each other and quite different from the others. Evidently this feature is reflected to some extent in the higher correlation. It means that a number of the individuals at least show a relatively greater constancy in speed in decisions of an objective nature than in the other types of decision. However, another similarity of the two tests, besides their objectivity, should be noted, for it may account for the higher correlation. The two tests are, after all, visual perception tests, and it is likely that equality of visual endowment, or more likely still, equality of practice in gauging by visual impression, may to a large extent determine the correlation.

The table of intercorrelations shows a still further distinction between these two objective tests and the others. If the averages of the columns be taken, with the rows II and V omitted, the figures resulting are as follows:

Test I	Test II	Test III	Test IV	Test V	Test VI
.513	.440	.473	.523	.425	.456

These figures show the averages of the correlations of each test with all others excepting II and V, and it becomes clear that tests II and V have the lowest average correlation with the rest of the tests. On the whole there is less correlation between the speed in objective types of decision and the subjective types than there is between the different subjective types here tested. This corroborates one of the observations of Bridges, reported at the beginning of this section.

A further very simple statistical treatment was applied to the test results, which yielded returns of considerable value for insight. It supplied a means of classifying the individuals tested, it presented a more intimate picture of the actual meaning of the correlations (uninfluenced by the disturbing attenuat-

ing circumstance), and it allowed a further comparison of the tests. The procedure was as follows: On the basis of the various distributions the grades in the various tests which represented most closely the 20 percentile score and the 80 percentile score were determined. These served then to differentiate the upper and the lower 20% individuals from each other and from the middle (60%) group. The choice of the 20 percentile as the distinguishing level was made after a scrutiny of the various distributions of scores. It was found by trial that the 80 percentile fell upon an even score in most of the tests, that is, definite groups were more regularly divided at about this point than at other points (like the 25 percentile) which were tried. The lower group is really marked off by the 23 percentile score. Thus the individuals were classified as being either speedy, slow, or ordinary in each test. On the score sheet, then, it became a simple matter of drawing a circle in black ink about all scores above the 80 percentile score, and a circle in red ink about those below the 20 percentile score. A small section of the score sheet is reproduced here to illustrate the effect of this procedure.

	Scores					
Subject	Test I	Test II	Test III	Test IV	Test V	Test VI
No. 125.....	(5)	(7)	22	(25)	20	12
No. 126.....	(9)	13	(13)	(29)	22	13
No. 127	(25)	(24)	(39)	(48)	(34)	(20)
No. 128.....	16	(5)	25	38	(33)	(10)
No. 129.....	10	(24)	(21)	37	23	(7)
No. 130.....	(7)	18	(34)	39	(10)	(18)
etc.						

Now to count the number of circles of different color which characterize the different individuals becomes an easy matter. The following table summarizes the counts. The first column shows the number of black circles, that is, the number of tests in which the individuals were among the upper 20% for speed; the second column shows the number of individuals who attained that status (who had that number of black circles to their credit). The third column and the fourth column, respectively show the same facts for the lower 20% (number of red circles) as columns one and two.

No. of tests	No. of persons high	No. of tests	No. of persons low
6	6	6	2
5	2	5	6
4	6	4	10
3	10	3	16
2	21	2	20
1	30	1	27
0	66	0	58

0 high and 0 low (middle grade in all tests) (with no circles of either kind).....12

This table indicates that 6 persons were in the upper 20% of the group of 142 in all 6 tests (like No. 127 in the section of the score sheet on the preceding page), 2 persons were in that group in 5 of the tests, 6 in 4 tests, 10 in 3 tests, etc.; and among the slow individuals, 2 were exceedingly slow in all 6 tests, 6 in 5 tests, 10 in 4 tests, etc. There were 12 individuals who failed to reach either the fast or slow status in a single one of the tests.

Clearly, there are here discovered two groups of individuals, and probably really three, to whom the general attribute of speed of decision, in some one of its forms as quick, slow, or mediocre, may be referred without much danger of inaccuracy. The one group of 6 individuals definitely possesses the quality of quickness in decision, as far as this number of tests gives evidence of it. Another group of 2 individuals may be labelled slow; and a third group of 12 individuals are characterized by constant mediocrity of speed of decision. These distinctly recognisable groups comprise 4%, 1%, and 8%, respectively, of the total number of students tested.

The degree to which the positions of the less pronounced individuals were interchanged from fast to slow and to middle groups in the various tests can also be determined readily by observation of the circles on the score sheet. A significant question which such a determination answers, for instance, is the following: Did the two persons who fell below the upper 20% in only one test fall way down into the slow group in that test? The same question is answered at the same time with respect to those who were high in all but two tests, all but three tests, etc.; and also the places taken by those who were low in all but one test, all but two tests, etc., can be determined. The answers are tabulated in the following manner. The table really constitutes an analysis of the correlations. It shows the fluctuations in position of individuals at the various grades or levels of possession of the trait. The

first line, if written out completely, would read as follows: 100% (2 individuals) of the 2 who were high in 5 tests (in all but one test) were mediocre in that one test.

TABLE SHOWING FLUCTUATIONS IN POSITION

High Groups.

100 % high in 5 tests are mediocre in 1 test.

100 % high in 4 tests are mediocre in 2 tests.

80 % high in 3 tests are mediocre in 3 tests.
10 % high in 3 tests are mediocre in 2 tests; low in 1 test.
10 % high in 3 tests are mediocre in 1 test; low in 2 tests.

57 % high in 2 tests are mediocre in 4 tests.
29 % high in 2 tests are mediocre in 3 tests; low in 1 test.
14 % high in 2 tests are mediocre in 2 tests; low in 2 tests.

43.3% high in 1 test are mediocre in 5 tests.
40 % high in 1 test are mediocre in 4 tests; low in 1 test.
13.3% high in 1 test are mediocre in 3 tests; low in 2 tests.
3.3% high in 1 test are mediocre in 2 tests; low in 3 tests.

Low groups.

100% low in 5 tests are mediocre in 1 test.

100% low in 4 tests are mediocre in 2 tests.

94% low in 3 tests are mediocre in 3 tests.
6% low in 3 tests are mediocre in 2 tests; high in 1 test.

60% low in 2 tests are mediocre in 4 tests.
20% low in 2 tests are mediocre in 3 tests; high in 1 test.
15% low in 2 tests are mediocre in 2 tests; high in 2 tests.
5% low in 2 tests are mediocre in 1 test; high in 3 tests.

30% low in 1 test are mediocre in 5 tests.
44% low in 1 test are mediocre in 4 tests; high in 1 test.
22% low in 1 test are mediocre in 3 tests; high in 2 tests.
4% low in 1 test are mediocre in 2 tests; high in 3 tests.

This table repeats facts, but it serves to make a few more assertions possible. It is really not only the meagre 4% (6 individuals) at the top of the scale, and the 1% at the bottom of the scale, who show constancy of speed in decisions. Inasmuch as the table shows 100% clear from slow decisions in both the group of 2 individuals who were high in 5 tests and the group of 6 individuals who were high in 4 tests—in the first two rows of the table—, it might be regarded as no great

distortion of fact to include the latter 8 individuals with the 6 of the upper group who are characterized by general constancy of speed. This raises the percentage of individuals who may be called truly speedy in decision to about 10%.

On the same considerations the slow group may be extended to include two more groups who showed 100% clear from fast decisions, and the percentage of truly slow individuals may be raised from 1% to about 13%. Further extensions than these would certainly not be justified by the facts shown in the table.

Conclusions

Correlations between test results are positive and fairly high, indicating that individuals who are quick in decisions of one kind tend to be quick also in decisions of other kinds. This does not constitute a demonstration of high degree of constancy of speed of decision, however, as later qualifications show. There is little likelihood that any one or two tests can be developed to measure the trait adequately. Whether or not this small battery of six tests may serve as a fair measure is not ascertained, and it remains an inviting inquiry.

In corroboration of Bridges' observation, to the effect that those persons quick in subjective decisions are not always quick in objective decisions, it is found that the correlations between speed in the two objective decisions and all others are lower than those between any of the other subjective decisions and the rest. Most constancy of speed (the highest correlation) is found between the two objective tests.

Percentile classification reveals three groups of individuals with whom a certain degree of speed of decision seems to be constant. The groups are very small, however. By lenient extension of classifying boundaries, the group which may be regarded as constantly speedy in decision (according to these tests) comprises 10% of the total number of students tested. 8% of the total number are constantly mediocre, and about 13% show constancy in slow decision. Strictly speaking, only 4% appear dependably fast, 8% mediocre, and 4% regularly slow.

A general criticism of the group testing situation should be added as an interpretation of the results obtained. The experience with individual tests of this same trait, with the tests on Self-assurance reported in the preliminary study, served to make the group testing situation appear unsatisfactory in several respects. The group test introduces an uncontrollable and undesirable factor of competition (not usual in the deciding-situations of life), and it reduces all

tests to a level of similarity to some extent, thus encouraging high correlations.

These two factors are probably more influential in determining these correlations than would appear to the observer not acquainted with the finer advantages of the individual test situation. With regard to the factor of competition, very clearly the rush to beat one's neighbor, or, disregarding the social influence as a disputable item, the rush against time, which is undeniably operative, makes of the test a measure of something more complicated than its name implies. One's decisions under stress of that kind are doubtfully like those (in speed) which one ordinarily makes. The instructions, the admonitions regarding the need of careful judgments, which are given to offset the adjustment favoring speed, only complicate matters. To the less suggestible and the more competitive belong the spoils.

The particular advantage of the individual test in this respect is the possibility of presenting the material in a manner, so that the subject may be kept ignorant of a time element in the test. Unless the essential feature of natural time-rate of decisions is kept in the situation a test cannot very well be said to measure natural time-rate of decisions. Yet that, it seems, is what we mean when we speak of speed of decision.

The other disturbing condition in the group testing situation is not an inherent obstacle to the success of group tests of speed of decision as the other factor is, but it is possible that its influence operated to some extent on the results of this investigation. For here was an attempt to present under a single cover, and in rapid succession, at the same sitting, and under the very same conditions of mood and motion, sets of problems for decision, whose principal value was supposed to lie in their variation from each other. At least, the correlations of the responses were to determine whether decisions of a variety of kinds tended to be elicited at relatively constant or variable speed from the same individuals. Surely, if the situations were identical in some such fundamental respect, any characteristic of the separate tests, or of the deciding activities responding to the tests, which might favor or incline toward variability, would be much reduced in effect. This possible influence is mentioned only as a reminder of the very doubtful character of the correlations found. They are not high as they stand, but if this similarity of conditions had been avoided in some way, so that the true nature of varied decisions had gained expression, it is possible that a greater degree of inconstancy would have been demonstrated.

Summary

1. Fair positive correlations show some constancy of speed of decision.

2. The difference between objective and subjective decisions is reflected in the correlations. Those persons quick in one type are less apt to be quick in the other type than in other decisions of the same type.

3 The large majority (fully 69%) of individuals tested cannot be classified as either quick, slow, or mediocre. They are too inconstant. Only 10% may be characterized as quick, 8% as mediocre, and 13% as slow, according to these tests.

4. No single test differentiates these relatively constant individuals from those whose scores fluctuate from extreme to extreme in the various tests.

5. Group tests have inherent disadvantages for measuring this trait, or for improving theoretical insight into its nature.

Capitulation

1. Logical analysis of Self-assurance reveals Over-estimation as an element which seems to be particularly amenable to experimental test.

2. Two tests are reported, which were tried and found to possess certain advantages for observation of tendencies to over-estimate. They also provide measures of natural speed of decision.

3. The trait of self-assurance, according to evidence of its nature gained by application of a big variety of tests, is still too imperfectly defined to enable the adequate testing of the tests by definite check against objective criteria. (The criteria are not determined.)

4. Development of a servicable criterion in the form of accumulated estimates, to aid which a rating scale was supplied, was successful in the matter of securing reliable estimates, but complexities of the trait, again, deprive the estimates of value as a criterion. Hence

5. The classification of specific forms of self-assurance and development of tests for each separately, is suggested as an improvement upon the attempt to deal with the trait in general. As criteria, then, either objective and directly measurable expressions of the trait may be discovered, or more useful estimates will be obtainable—estimates which shall definitely bear upon the features which the test seeks to measure, and upon these alone.

6. Speed of decision is probably not a reliable indicator of self-assurance.

7. Inconstancy in speed of decision is demonstrated to be the characteristic of the majority of students tested. Constancy seems clearly to be the exception rather than the rule, even under conditions favoring constancy.

8. Speed of decision is not likely to be measured by any one test or by a few tests, excepting in individuals of proven constancy.

9. Group tests have inherent disadvantages for measuring speed of decision, or for improving theoretical insight into the nature of the trait.